ABSTRACT

The present invention is directed to enable mode conversion between a TEM mode and another mode to be performed among a plurality of waveguides. An RF module comprises: a TEM waveguide as a first waveguide for propagating electromagnetic waves in a TEM mode; and a waveguide having a multilayer structure as a second waveguide connected to the first waveguide, for propagating electromagnetic waves in another mode different from the TEM mode. An end of the first waveguide is directly conductively connected to one of ground electrodes of the second waveguide from the stacking direction side of the ground electrodes. Since magnetic fields are coupled so that the direction of the magnetic field of the first waveguide and that of the magnetic field of the second waveguide match with each other in the H plane, mode conversion between the TEM mode and another mode can be excellently performed between the waveguides.